Several of the Examiner's comments in this presenting this rejection focus upon what water clusters are, the relevant properties thereof and how the teaching in the cited references allegedly relate thereto. In view of this, Applicant believes that it would be helpful to briefly summarize the background of this invention, as set forth in the specification, to help assure a clearer understanding of the invention as claimed and the distinctions from the cited references, as follows:

The present invention provides water nanocluster/oil compositions and methods for delivery of water clusters to the skin. The water nanoclusters have at least one dimension of less than about 10 nanometers and specific embodiments are more specifically characterized as to the cluster's size (e.g., 0.8 nm or less) and the cluster's form (e.g., needle-like arrays, discussed at Page 3 line 16 to Page 4, line 16). The water clusters will be present in the oil as a water-in-oil (w/o) emulsion, wherein oil is the continuous phase and water is dispersed therein (see, e.g., Page 8, line 21 et seq.), as distinct from being in the form of a oil in water (o/w) emulsion in which the oil is dispersed in the water (i.e., water is the continuous phase). The specified water clusters in the w/o emulsion of the present invention provided important advantages when applied to the skin, including anti-oxidant benefits from the water clusters *per se* (see, e.g., Page 10, line 11 to Page 11, line 14). In particular, the water clusters of this invention provide unique water-cluster surface pΠ electron donating orbitals which are capable of donating electrons to cell-destroying free radicals, in a manner similar to that believed to be associated the pΠ electron orbitals of Vitamin E.

Turning specifically to the references relied upon in the 35 USC 103 rejection, as noted by the Examiner:

EP 0916621 is directed to the uses of water as a dispersing media and dealing with the stated difficulties of dissolving or dispersing substances in water without using a solvent or detergent. The reference teaches a solution involving the use of "fine" clustered water" prepared from "pure" water, which is said to improve the solubility or dispersing ability of oil and fats in the water. The terms "pure water"(defined by a specific resistance of 50 or less) and "cluster"(defined as an "aggregate of molecules" are defined at Page 3, lines 15-20). However, importantly, the term "fine" is neither defined nor quantified by example or otherwise. The closest teaching to a "definition" in the reference appears in the statement at Page 3, lines 19-20, namely, "In the present specification, a fine clustering treatment means reducing the size of the cluster." However, this

does not provide any reasonable definition or quantification of "fine", since the described treatments range from the use of magnetic fields, to electric currents, to mechanical, to ultrasonics, etc. (see Page 3, line 30 to Page 4, line 52) which could produce vastly different "reducing of size", even assuming that the starting point (how many molecules of water were in the starting water cluster) were specified, but it is not. The only treatment approach specifically exemplified is the "magnetic method" which involves passing the water through a "slit" between magnetic plates, with the slit size stated to be "not limited", but preferably "about 2 mm" from which one might conclude that the water clusters were of that mm dimension (see Page 4, lines 15-42). EP 0916621 describes and claims an ability to disperse more of specified substances (e.g., glycerol oleates) in its fine clustered water, to a greater extent than is dispersed in ordinary purified water.

Johnson et al provides water cluster compositions characterized by high reactivity due to protruding delocalized pΠ orbitals and methods of producing and using them. Water clusters are described and claimed with specific parameters, including the specified orbital configuration and dimensions (less than 10Å). The reference teaches the use of water clusters in oxidative reactions, which is defined as reactions which involve transfer of oxygen atoms from one molecule to another (see e.g., Column 8, lines 14 to 20). More particularly, the reference teaches the use of water clusters in processes in which fuels (e.g., diesel fuel) are combusted, namely, the combustion of water cluster/fuel compositions in which the water cluster's reactive oxygen provide that the specific energy of combustion mixture is enhanced compared to the specific energy observed when the pure fuel is combusted under the same conditions (see e.g., Column 8, line 55 to 65). The compositions taught by the reference are described as waters clusters dispersed with in a fuel (i.e., w/o compositions) and states that surfactants may be employed to stabilize the water cluster/fuel composition if desired (see, e.g., Column 8, lines 64-65).

With the above background in mind, turning specifically to the rejection of record, it respectfully submitted that the references alone or in appropriate combination do not teach or suggest the present invention, and the rejection as to all pending claims is inappropriate, for at least the following reasons:

(1) The present invention involves water nanoclusters which are specifically defined and importantly related to the advantages of the present invention. EP 0916621 only disclosed "fine" clustered water and as discussed above the term "fine" is

neither defined nor quantified in the reference. The Examiner statement that the references teaches the "advantages of microclustered water" is without any support and improper particularly if intended to suggest that the reference suggests use of the specific water clusters taught by the present invention. Importantly, the absence of any definition or quantification in EP 0916621 of "fine" is not only an absence of a teaching of an important element of the present invention, it can only be reasonably interpreted to mean that the reference used this term in a non-specific qualitative sense, especially since the reference did specifically define or quantify other terms. There is no indication in the reference whatsoever of any need to go to a specific form or degree of "fine" clusters. The only reasonable inference in that the specific size or form or degree of "fine" clusters is not important to the practice of EP 0916621's teaching, and there would be no reason, direction or motivation to look to other teachings of water clusters, and clearly there would be no reason, direction or motivation to look to the teaching of water clusters in combustion applications as in Johnson et al, as discussed more fully below.

(2) The present invention involves water (w/o) emulsions. Importantly, as noted above, EP 0916621 is directed to the use of water as a dispersing media and dealing with the stated difficulties of dissolving or dispersing substances in water [e.g., to form better oil in water (o/w) emulsions] without using a solvent or detergent. The reference teaches the use of water to improve the delivery the dispersed substance (e.g., as stated at Page 5, lines 4-6 of the reference "The fine-clustered water from pure water of the present invention has not only a high dispersing ability of oil and fats, but also improves the absorbability of a dissolved or dispersed substance…"). It is respectfully submitted that the Examiner statement that the references teaches the "water-in-oil emulsions containing… " is without any support. The reference nowhere characterizes its compositions as water-in-oil or w/o emulsions, and it is clear in context that the emulsions are oil-in water (o/w) emulsions. The entire thrust of the reference is that the fine water is an improved dispersing media (i.e., water is the continuous phase which is the case in a o/w emulsion with the oil being the dispersed phase). Contra distinctly, the present invention is not focused upon the dispersing properties of the water, since water is not the dispersing agent in a water-in-oil (w/o) emulsion. The specific water nanoclusters of the present invention are not selected to enhance the dispersability of the oil, but instead are selected and specified because of other unique properties of the water nanoclusters *per se* (e.g., the antioxidant properties discussed below). Since EP 0916621 is focused upon the improved dispersibility of oil in water (i.e., o/w emulsion) and to

provide compositions which limit or avoid the need for surfactants, there would be no reason, direction or motivation to look to the teaching of water/oil (w/o) compositions in Johnson et al. As noted above, the compositions taught by Johnson et al are described as waters clusters dispersed within a fuel (i.e., w/o compositions) and Johnson et al states that surfactants may be employed to stabilize the water cluster/fuel composition if desired (see, e.g., Column 8, lines 64-65).

(3) Applicant respectfully submits that the Examiner statement that "One would be motivated to use Johnson's water in EP's composition, since Johnson teaches the clustered water may be used in any oxidative reaction" appears to been made in view by inappropriately relying upon a teaching of the present invention and/or a technical misunderstanding of the difference between "oxidation" as taught in Johnson et al and "antioxidant" properties as taught in the present invention.

First of all, EP 0916621 does not at all focus upon or even mentions any chemical reaction of its fine clustered water nor of any reason why one would want to enhance the water reactivity. To the contrary, in the applications (i.e., the pharmaceuticals, foods, and cosmetics noted at Page 1, lines 17 to 20), the presence of solvent or detergents was described as potential safety problem, making pure water (which is commonly preferred due to its inertness) or fine clustered water derived from it, as the reference's focus and teachings. Although other fields of use of the fine filtered water are noted in the reference, none mention any of the use need or desire for the water to be reactive. For example, in the references mention of the use of water in the fuel industry (as cited by the Examiner), this appears to relate to the fine water's dispersability (e.g., the references discussion of these in the "coal and petroleum/fuel industries" at Page 6, lines 45-46, mention applications in which water's dispersion properties are involved). Certainly the oxidative or other chemical reactivity of water is not even mentioned. Clearly, there is no basis in EP 0916621 to look to Johnson et al. teaching of reactive water clusters. To the contrary, EP 0916621 express intent to seek to avoid the safety concerns posed even by solvents or detergents would teach away from using Johnson et al reactive clusters.

Secondly, there is a significant difference between the present invention's teaching of providing <u>anti-oxidant</u> properties antioxidant and Johnson et al.'s teaching of the use of water clusters in processes in which fuels (e.g., diesel fuel) are combusted in an <u>oxidative</u> reaction. As noted above, Johnson et al. teaches the combustion of water cluster/fuel compositions in

which the water cluster's reactive oxygen provides that the specific energy of combustion mixture is enhanced compared to the specific energy observed when the pure fuel is combusted under the same conditions. But importantly, as also noted above, Johnson et al.'s use of water clusters in such oxidative reactions, is clearly defined as reactions which involve transfer of oxygen atoms from one molecule to another (see e.g., Column 8, lines 14 to 20). Combustion of fuels generally only occurs at a relatively high temperature and involves a chemical reaction in which the oxygen atom(s) from one molecule (e.g., O_2 or Johnson et al.'s H_2O with reactive oxygens) chemically combines with carbon (C) molecules in the fuel to form CO or CO_2. In such a chemical reaction, the reactants give up some of the atoms of which they were composed prior to the reaction. This is significantly different than the antioxidant function taught in the present invention. As described above, the water nanoclusters of this invention provide unique water-cluster surface pΠ electron donating orbitals which are capable of donating electrons to cell-destroying free radicals, in a manner similar to that believed to be associated the pΠ electron orbitals of Vitamin E. In this antioxidant function, although there is a transfer of electrons, no atoms are transfer and the water cluster molecules remain intact. Thus, the teaching or suggestions related to oxidation and antioxidants are significantly different, both technically and functionally.

Thirdly, the present invention does disclose antioxidant properties of its water nanoclusters and its importance in imparting these desirable properties in skin application of cosmetics and pharmaceuticals. But this teaching of the present cannot be properly used to read into EP 0916621 a motivation to combine a teaching of providing anti-oxidant properties to that reference's fine cluster teachings. As explained above, Johnson et al does teach oxidative/reactive properties of its water clusters through transfer of oxygen atoms from one molecule to another, not antioxidant functions which involved the donation of electrons. But even assuming arguendo that Johnson et al's teaching of oxidation and anti-oxidation were equivalent (and they are clearly not), the combination of EP 0916621 and Johnson et al on this point would be improperly based in hindsight on the teaching of the present invention, not on the teachings of the references.

(4) The Examiner citation of Johnson et al's teaching of the "importance of water in biological reaction" is correct, but does not meaningfully relate to or support the rejection. As noted in Applicant's previous response, Applicant does not dispute that water is important in biological reactions and noted that the human body is 70% water. However, in the cited portion of Johnson

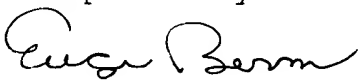
et al (Column 1, lines 4-70), Johnson et al is clearly referring to the studies of the properties of ordinary bulk water and there is no teaching or suggestion of the biological reactions of Johnson et al' water clusters and certainly no teaching or suggestion of the water nanoclusters of the present invention or any biological aspects thereof.

(5) The foregoing remarks apply to each of the process and composition claims pending in the application. Additional specific basis for allowance exist as to individual claims. For example, the cited references do not alone or in combination teach or suggest: the needle-like form specified in Claim 16; the reverse micelle structure specified in Claim 17; the needle cavity resulting in cylindrical for the water nanoclusters set forth in various of the claims. None of these important distinctions were noted in Office Action.

In view of the foregoing, it is respectfully submitted that the application is now in condition for allowance, and early action in accordance thereof is requested.

In the event there is any reason why the application cannot be allowed in this current condition, it is respectfully requested that the Examiner contact the undersigned at the number listed below to resolve any problems by Interview or Examiner's Amendment.

Respectfully Submitted,



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